

ABSTRACT

A plasma processing unit of the present invention includes a processing container whose inner pressure can be reduced, a first electrode arranged in the processing container, a process gas supplying unit that supplies a process gas into the processing container, a high-frequency electric power source that outputs high-frequency electric power having a frequency in a VHF band, a matching unit electrically connected to the high-frequency electric power source and the first electrode for impedance matching, and a transmission line that transmits the high-frequency electric power from the high-frequency electric power source to the matching unit. A substrate to be processed is adapted to be arranged in the processing container. The high-frequency electric power transmitted to the first electrode is adapted to generate plasma in such a manner that the substrate to be processed can undergo a plasma process by means of the plasma. The transmission line has a length shorter than a length wherein a resonance state of a third harmonic wave of the high-frequency electric power may be generated.